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Title : Physiological strategies of southern elephant seal pups during transition to parental independence

Category : Ecology

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Abstract : Large absolute energy stores are generally assumed to incur higher probabilities of survival of individuals, but it may be even more critical to achieve an appropriate balance in utilisation of various body components for growth and body maintenance. We measured changes in mass and body composition of southern elephant seal pups from Macquarie Island during the post-weaning fast and the first foraging trip. Absolute lipid stores decreased by ~20kg (>30%) over the fast, and increased by ~25kg (~69%) over the foraging trip, while the relative lipid content changed by only a few percent (~45% at weaning; 42% at departure and 43% at return). While there were no significant differences between the sexes at weaning, female pups were significantly fatter (>1.5%) at departure as well as upon return to land (~1.5%). Individual differences in relative lipid content decreased significantly from weaning to departure, and again increased while at sea. While large differences at weaning reflect variations in maternal investment, the smaller variation at departure suggests that body composition converge towards some appropriate level up to departure. Such adjustment while fasting results from higher relative energetic contribution of lipid in fatter pups, but also by fatter pups having a slightly longer fast. The increase in individual differences in relative lipid content while at sea may reflect differences in foraging success during the first trip. However, our data showed no obvious benefits to greater lipid stores at departure, and pups tend to increase their absolute lipid contents by similar amounts irrespective of their body composition at departure. We argue that there is a substantial amount of flexibility in physiological strategies after weaning, and that although small lean pups will be under more severe constraints, the survivors have been able to successfully compensate for early imbalances in material and resource use.